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the backward pull, the firmer and the more extensive the attachment to the sharp barbs; the wounded and impaled organ becomes congested and swollen, and the insect is seldom able to disengage it. Especially is this the case with the larger flies. Some perish by exhaustion, but more of them, passing round and round in a circle and in one and the same direction, come to an end by twisting off their heads!"——Trimen's *Journal of Botany* for October, gives us a note on borage, by H. F. Hance, of interest to American botanists.——Prof. P. von Tieghem has succeeded Brongniart as Professor of Botany at the Museum at Paris.——In Caruel's *New Italian Botanical Journal*, is an article on the morphology and biology of freshwater algæ allied to Nostoc, etc., by A. Borzi.

ZOÖLOGY.[1]

NOTES ON SOME REPTILES AND BATRACHIA OF THE PACIFIC COAST.—The large frog (*Rana temporaria* var. *aurora*), sometimes called "bull-frog," of this coast is eaten in considerable quantity in San Francisco. Its consumption is not confined to Frenchmen, at whom some rude people are apt to scoff as "frog-eaters," but extends to some individuals of the beef-eating nation, as well as to Americans and those of other nationalities.

The real bull-frog is much larger than our species, yet a large specimen of the latter reaches the very respectable length of five and a-half inches from the nose to where the tail of his tadpole days commenced. Such large frogs are by no means cheap delicacies, since they are retailed at four dollars per dozen. The smallest I have yet seen in the market were worth one dollar and seventy-five cents per dozen. And there is reason for the high price.

Ponds and brooks margined or partly overgrown with water-weeds, such as frogs love, are scarce in the vicinity of San Francisco, and most of those which occur have been to a great extent depopulated of their croaking inhabitants long ago.

Those brought to market are caught in Marin county, in brooks and boggy places beyond San Rafael; in San Mateo county; even as far away as Visalia, which, from its position in what is known as the "Four Creek Country," would seem to be especially fitted for their production.

Two or three Frenchmen are the only people who systematically make it their business to catch these batrachian delicacies; and when we consider the long and toilsome journeys across rough country that these men have to perform, we cease to wonder that they are not cheap.

Chelopus marmoratus Baird and Girard. Out of about thirty-eight species of fresh-water turtles or terrapins found in the United

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[1] The departments of Ornithology and Mammalogy are conducted by Dr. ELLIOTT COUES, U. S. A.

States, one only, known to zoölogists as *Chelopus marmoratus*, is, so far as I am aware, found in California, and is the terrapin of our markets.

Terrapins were once common in the creeks and ponds around the bay, but the constant demand for their flesh has made them scarce, so that the present supply comes from the region around Sacramento, from Knight's Ferry, from Tuolumne county, and the southern part of the San Joaquin valley generally; as well as from the neighborhood of Visalia.

The dealers say that those from Visalia and from the San Joaquin are far superior to those from Sacramento. In the latter the under side is almost white, while in the former it is dark, approaching black; the latter will often die by the dozen soon after they are brought in for sale, while the former will keep alive for months.

A terrapin thus kept and not fed, gradually diminishes in weight, but is not injured in any other way. During its confinement it is really feeding on its own fat, and small as is the range of its activities, and gradual the waste ensuing from them, the results are obvious after a month or two; so that a terrapin kept six or seven months without food, though still alive, is little but shell, bone and skin.

Terrapin are abundant in the reservoir of the San Rafael water works, where, however, fishing is not allowed without permission. There are some in the basin of the fountain at Woodward's Gardens, and of these, having discovered that small lumps of dirt thrown at it while sunning itself on a rock do not hurt it, declines any more to dive under these provocations, and simply cranes its long neck to see what is the matter.

Heloderma suspectum Cope. Several specimens of this large lizard have been presented to the California Academy of Sciences or to Woodward's Gardens during the past year. It attains a length of about eighteen inches, has a thick stout body of a bright yellow color mingled with brown, and it is of a most unattractive aspect, which doubtless accounts for its title of "Gila monster." It has the unenviable reputation of being a poisonous lizard, and although it has been proved not to be poisonous by experiment, as there is not in nature, so far as is known, such a thing as a poisonous lizard, yet the idea is based on a better foundation than that of most popular beliefs, for, as I am informed by Prof. Cope, the front teeth are grooved and there is a gland at the base. For this reason Prof. Cope named it *suspectum*, and he appears to think that after all he would prefer to be bitten by some other kind of lizard.

The Gila monster is slow in its motions, and when pursued will stop and show fight in a feeble sort of way—peculiarities which, together with the large size and conspicuous color, render it easy to be captured, and it is not unlikely that it will ere long become extinct, as it is killed wherever found. It would be interesting to know what this large, slow-moving lizard finds to live upon in the arid wastes of Arizona.

Chirotes. The curious "hand-eared lizard," which, lizard though it is in structure, would look exactly like a snake were it not for two curious little limbs placed close to the head, has been found in Lower California, a district which, as regards its reptilian fauna, is more properly included in the Nearctic or North American region than in the Neotropical or South American.

No mention is made of this species in the check-list of Nearctic reptiles drawn up by Prof. Cope, and published by the Smithsonian Institution, but two specimens were obtained at La Paz by Mr. Turner, U. S. Consul at that place, and presented to W. I. Fisher, of San Francisco; and Prof. Cope informs me that a European herpetologist has also obtained some from Lower California.

Chirotes belongs to the Amphisbænia, which are characterized by a thick short tail, inconspicuous rudimentary eyes, and a body surrounded (as is also the tail) with numerous rings of small square plates. All the genera except Chirotes are destitute of limbs, and as they have the power of moving backwards, are popularly regarded as poisonous snakes, possessed of a head at each end of the body. The two little legs, each furnished with five toes ending in pointed claws, save Chirotes from this imputation.

The hand-eared lizard is about eight inches long with about two hundred half-rings of small, square plates on the back and a smaller number of half rings of similar but larger scales on the belly. Along the side, where the rings of back and belly meet, are some small triangular scales filling in the interstices.

The mouth is very small, the few plates on the top of the head not conspicuous, the eyes scarcely discernible, and the neck of the same thickness as the body, which is about the calibre of a lead pencil.

Aniella pulchra Gray. This little snake-like creature is entirely destitute of limbs, and is, therefore, usually regarded as a snake, but the structure of the head is lacertian, and it is classed among the Lacertilia. It is the only species of its family, the Typhlopidæ, found in North America, and is probably confined to the southern part of the Pacific region. The Typhlopidæ are burrowers, with very small eyes and a blunt tail, in these respects resembling the Amphisbænidæ, but they differ from that family in the character of their covering, which is formed of small diamond-shaped scales instead of regular rings of square or oblong scales.

Aniella pulchra appears to be dug up with tolerable frequency in the southern parts of California, but is not found around San Francisco. It is about eight inches long, slender, of a bright gray color above and light blue underneath, with a band of yellow along the center line of the back. A living example, domiciled in a cigar box partly filled with dirt, did not appear to be very active or very timid, as it would rest quietly upon the palm of the hand, and scarcely attempted to move away when touched. When placed upon the dirt in the box, however, it burrowed very deftly.—*W. N. Lockington.*

ANECDOTE OF THE GREAT HORNED OWL.—Many years ago I observed a singular habit of the owl, a notice of which I have never seen published. In the "funny column" of our local newspaper, a paragraph appeared headed "How to kill an Owl," the substance of which was: after finding an owl on a post or tree, you were to have him fix his eyes upon you, and then walk rapidly around him; closing with the statement that he will keep his eyes so intently upon you, turning his head with your movements but forgetting to turn his body, that he will thus wring his own head off.

Nothing is too absurd for a boy to attempt if it promises fun or novelty; and shortly afterward a fine live specimen of a nearly adult *Bubo virginianus* falling into my hands, I proceeded to test the matter by experiment. I placed Bubo on the top of one of my mother's clothes line posts, where he remained motionless and entirely unconscious of the attempt about to be made upon his life. It was not difficult to secure his attention, for he never, while I had him, diverted his gaze from me while I was in his presence. I began walking rapidly around the post, a few feet from it, keeping my eyes fixed upon him all the while. His body remained motionless but his head turned exactly with my movement. Half way round, and his face was directly behind. Three-quarters of the circle, and still the same twist of the neck, and the same stare following me. One entire circle, and no change. On I went, twice round and still that watchful stare and steady turn of the head. I had all this time kept uninterrupted watch of the bird. His talons grasped the top of the post, and his body was perfectly stationary. On I went, three times round, and I began really to wonder why the head did not drop off, when all at once I discovered what I had failed to notice before. When I reached half way round from the front, which was as far as he could turn his head to follow my movement with comfort, he whisked it back through the whole circle so instantaneously, and brought it facing me again with such precision, that I failed to detect the movement, although I was looking intently all the time. I repeated the experiment many times afterward on the same bird, and I had always to watch carefully to detect the movement of the readjustment of his gaze. So rapid and precise was this movement that I failed several times to detect it, even when I was looking expressly for it, and at the proper moment.—*C. A. W.*

NOTE ON THE NOMENCLATURE OF HESPEROMYS AMERICANUS COUES AND YARROW.—A note recently published in the Annals Mag. Nat. Hist., by Oldfield Thomas, Esq., "On Robert Kerr's Translation of the 'Systema Naturæ' of Linnæus," gives some important information respecting that rare and obscure book. It appears that, among the Mammalia, the species described in Pennant's History of Quadrupeds (1781), and Phillips's Voyage to Botany Bay (1789), here receive Latin names, forestalling those in Shaw's General Zoölogy (1800–1804).

Among such names are a number affecting North American species. Thus, *Lutra canadensis*, *Mustela americana* and *Didelphys virginiana* must be accredited to Kerr, 1792, not to Shaw or Turton, as we have usually done.

From a private note, kindly addressed to me by Mr. Thomas, it appears, among other things, that *americanus* Kerr, must be used instead of *leucopus* Raf., for the common American white-footed mouse, there being in Kerr, on p. 231, a certain *Mus agrarius americanus*, which is based on Pennant, Hist. Quad., No. 302 b. In their article on Mammals, in Vol. v. of the Wheeler quarto Report of the Survey west of the 100th meridian, Drs. Coues and Yarrow called the species *H. americanus* (Kerr); but afterwards, having meanwhile no opportunity of verifying the reference, Dr. Coues reverted to the use of *H. leucopus* Raf., in Monog. Rodentia, *Muridæ*, p. 50 (see also note (2) on p. 51).

Unless, therefore, some still earlier name be forthcoming, this mouse must bear that at the head of this article, and its subspecies, of which there are several, should be called *H. americanus sonoriensis*, *H. americanus eremicus*, *H. americanus gossypinus*, etc.—*Elliott Coues, Washington, D. C.*

THE FISHES OF KLAMATH LAKE, OREGON.—A collection made at various points on the Upper Klamath lake yielded eight species of fishes, as follows: 1. *Salmo iridea* Gibb. This trout is found abundantly in the lake, as well as in the streams tributary to it; e. g., Sprague river, Wood river, Crooked creek, Fort creek. It reaches a weight of ten pounds, and varies in color from white to red on the sides. 2. *Salmo spectabilis* Gird. The Dolly Varden is less common than the *S. iridea*; the only locality from which I procured it is Seven Mile creek, near Fort Klamath. 3. *Chasmistes luxatus* sp. nov. This is a large fish, and with its congener below named, of no little interest, as extending the range and characters of Jordan's little-known genus *Chasmistes*. Form elongate, head long, flat above, and with a large fontanelle. Mouth terminal, the spines of the premaxillary bones projecting so as to form a hump on the top of the snout. Lower lip a very thin dermal fold, extending entirely around the chin. Scales 12–80–9; radii D. 11, A. 9. Color clouded above with black punctulations; below paler, with red shades in some specimens; fins uncolored. It attains a length of nearly three feet. It ascends the streams in thousands in the spring, and is taken and dried in great numbers by the Klamath and Modoc Indians. The former call it Tswam. 4. *Chasmistes brevirostris* sp. nov. This fish does not exceed 14–16 inches in length, and has a differently formed head and muzzle from the *C. luxatus*. They are shorter, especially the muzzle, and the latter is without the hump produced by the protuberant premaxillary spines. Parietal fontanelle small. The lower lip-fold is only present at the sides of the mandible. Body nearly cylindric. Scales 12–74–11; radii, D. 11, A. 9. Color dusky above, silvery below; fins colorless. This fish is abundant in the lake, but I was informed by a Klamath Chief, that it does not ascend Williamson's river in spring with the *C. luxatus* and *Catostomus*. Klamath name Xoöptu. 4. *Catostomus labiatus* Gird. Very abundant; Yehnne of the Klamaths. 5. *? Mylopharodon* sp. Not certainly of this genus, and resembling the genus *Anchybopsis*, found fossil in the Idaho and Oregon Pliocenes. I was interested to find this species quite abundant. I am not yet able to ascertain whether the present species is one of those already named or not. 6. *Gila*. A species of medium or small size, and rather robust proportions. 8. *Uranidea*. Undetermined; a stout species, and very abundant.—*E. D. Cope.*

NEW CLASSIFICATION OF THE CRUSTACEA.—The recent studies on the embryology of the king crab (*Limulus polyphemus*) has shown that there are some unexpected resemblances to the mode of development of the Arachnida, and while in our essay[1] on the development of this Crustacean we attempted to show that the arachnidan features were also to be found in certain crabs and shrimps whose development was exceptional, one or two naturalists, as E. Van Beneden and Dohrn, claim that Limulus is not a true Crustacean, but belongs next to or with the Arachnida. This seems to us an extreme view. Then followed the beautiful anatomical researches of Alphonse Milne-Edwards on *Limulus polyphemus*, in which he showed the singular relation between the vascular and nervous systems; the latter being enveloped by the ventral system of the arteries. The differences between the nervous system of the king crab and Arachnida has been already indicated.[2] It has not been, we think, sufficiently taken into account that Limulus is a generalized or synthetic type, combining with features of its own, certain resemblances to the Arachnida and to the normal Crustacea. In its mode of respiration, its external gills, and in its circulatory organs it is, as we have previously stated,[3] essentially a Crustacean, but should be placed apart from the normal Crustacea, and form the living representative of a subclass, equivalent to all the other living Crustacea. To Limulus are closely allied the fossil Merostomata; and we regard, for reasons already stated, the Trilobites as closely allied to the Merostomata.

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[1] The Development of *Limulus polyphemus*. By A. S. Packard, Jr. (Memoirs of the Boston Soc. of Nat. Hist.) Published March, 1872.

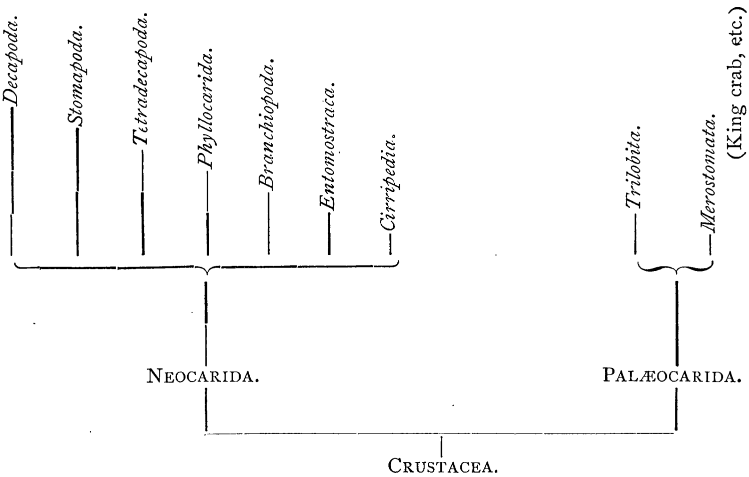
[2] AMERICAN NATURALIST, Vol. 9, p. 422, 423. July, 1875.

[3] Farther Observations on the Embryology of Limulus, with notes on its affinities AMERICAN NATURALIST, Nov., 1873, Vol. 7, p. 675.

For this subclass we have proposed the name *Palæocarida*, and for the normal Crustacea we have proposed the term *Neocarida*.

In order to express the relations of the two subclasses of Crustacea, we have published[1] the following table showing the mode of grouping of the different orders of the two subclasses of the class of Crustacea:

CLASSIFICATION OF THE SUBCLASSES AND ORDERS OF CRUSTACEA.



While the *Neocarida* are characterized by the well known features peculiar to all living Crustacea except *Limulus*, the *Palæocarida* have, among others, the following characters: Appendages of the cephalo-thorax in the form of legs, rather than jaws; no antennæ; brain on the same plane as the cephalo-thoracic ganglionic ring, and supplying nerves to the eyes alone; nerves to the cephalo-thoracic appendages sent off from an œsophageal ring; nervous system ensheathed by a ventral system of arteries; metamorphosis slight. Sexes distinct.

Order 1. *Merostomata.*—No distinct thoracic segments and appendages. (Limulus, Eurypterus, etc.) *Order* 2. *Trilobita.*—Numerous free thoracic segments and jointed appendages. (Agnostus, Paradoxides, Calymene, Trinucleus, Asaphus, etc.; all extinct.)

A farther elaboration of this classification, with full references to the labors of others, is to be given in a second memoir on the anatomy and development of *Limulus polyphemus*, in course of preparation.—*A. S. Packard, Jr.*

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[1] Zoölogy for Students and General Readers. American Science Series. By A. S. Packard, Jr. H. Holt & Co., New York. Published in Dec., 1879. 8vo, pp. 703.

ZOÖLOGICAL NEWS.—A number of papers on the Hymenoptera and Coleoptera of the United States, by Messrs. E. Norton, C. A. Blake and Dr. Horn, are in course of publication in the Transactions of the American Entomological Society of Philadelphia.——A detailed and fully illustrated account of the development of *Palæmonetes vulgaris*, by Mr. Walter Faxon, appears in the *Bulletin* of the Museum of Comparative Zoölogy.——Mr. S. H. Scudder, of Harvard University Library, Cambridge, has nearly ready for publication by the Smithsonian Institution an index to all genera hitherto proposed in zoölogy, whether for recent or fossil animals. It is to be based upon the "Nomenclators" of Agassiz and Marschall, and the indexes to the Zoölogical Record.——Prof. Allen Thompson, in *Nature*, confirms the statement that the scorpion commits suicide by stinging itself in the middle of the top of its head.——The early stages of the Cœcilians, or blind snakes, have recently been discussed by Peters, according to *Nature*. An observer in Cayenne saw, according to Herr Wrzensniowski, of Warsaw, a female *Cœcilia compressicauda* give birth, in water, to two young ones alive. The Russian observer, on receipt of the alcoholic specimens, found in the oviduct five more young ones. The young had no trace of lateral gill openings like those discovered in *Epicrium glutinosum* of Ceylon, but it has external bladder-like gills, like those of *Notodelphys ovifera*. Hence these blind amphibia should, when young, be looked for in water. *Cœcilia oxyura* has branchial clefts but no external gills, while *C. rostrata* of the Seychelles has neither branchial clefts or a swimming tail, or any scars showing the former presence of external gills.

ANTHROPOLOGY.[1]

ANTHROPOLOGICAL NEWS. — The following vocabulary of the Caddoquis, or Caddo, language was received from Judge J. F. H. Claiborne, of Natchez, Miss., who writes, "It was prepared and sent to my uncle, Gov. Claiborne, of Louisiana, by Dr. Sibley, agent for the Caddos, an educated gentleman. The southern Indians held this tribe in great respect for its supposed antiquity. It was known as the Father tribe."

Among the Smithsonian Comparative Vocabularies, now in charge of Major J. W. Powell, is a short one of the Caddo, No. 444, by Dr. D. J. Macgowan, taken in 1865.

All that remains of this once flourishing tribe are gathered on the Witchita agency, in the Indian Territory. The agent, Mr. A. C. Williams, reports their numbers at 467 persons, principally

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[1] Edited by Prof. OTIS T. MASON, Columbian College, Washington, D. C.